Maximizing the Potential of a Recycling Machine Using Image Classification

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Humanity produces around 1.3 billion metric tons of waste a year, and most of them ends up in landfills. To make things worse, even much of recyclable garbage is eventually wasted. The main cause of this avoidable waste is improper recycling. Recycling machines that are currently being used as a solution tend to be too bulky and expensive to be deployed in public places in place of trash cans. This observation led us to decide to develop a system that can address this issue. The main factor leading to bulkiness and high price of the currently available recycling machines lies in the sensors they use for garbage sorting. Inspired by the fact that humans mostly use vision for recycling tasks, we developed a low-cost, small-size system that could replace trash cans and improve recycling accuracy and efficiency. Instead of using an array of sensors, we used a single camera in the classification process, thereby allowing the system to be smaller and inexpensive in comparison to the currently available counterparts. The small computer attached to the system sends the picture of a garbage item over a wireless network to the high-performance external classification computer. Using the image as input, it sorts the garbage into four pre-selected categories: Non-decomposable garbage, Plastic, Aluminum and Paper. Accordingly motors and servo motors are activated to transport the garbage item into its proper location.

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